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ABSTRACT

Using a cost analysis system developed by the Maryland State Board for Community Colleges, this report presents information on cost per course, cost per student credit hour, and cost per full-time equivalent (FTE) student for each instructional discipline at Prince George's Community College (PGCC). Total cost figures are the sum of faculty compensation, additional direct instructional costs (including classroom or laboratory supplies and equipment), and indirect or overhead costs. Selected findings include the following: (1) in fiscal year 1987, the total cost per credit hour was $111.99, while the cost for credit coursework per FTE student was $3,360; (2) faculty compensation represented 44% of the total cost, while overhead represented 53%; (3) cost per FTE student rose steadily from $1,973 in 1980 to $3,118 in 1987; (4) general education courses in the arts and sciences were more expensive than occupational or continuing education courses; (5) community services noncredit courses cost $2,520 per FTE in 1987, representing a 9% increase over the previous year; (6) total cost per FTE student was highest in Physical and Health Education, Health Technology, and Engineering Technology, and lowest in Developmental Studies, Social Services, and Business and Management; and (7) PGCC spent substantially less per student to deliver credit courses than both the average of the six largest community colleges in the state and the overall statewide average. A discussion of the determinants of direct costs is included in the report, as well as data displays showing costs by discipline. (EJV)

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DISCIPLINE COST ANALYSIS FOR FISCAL YEAR 1987

Report to the Board of Trustees

prepared by the
Office of Institutional Research and Analysis
Prince George's Community College
Craig Clagett - Director

BT88-3
December 1987

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PRINCE GEORGE'S COMMUNITY COLLEGE
Office of Institutional Research and Analysis

DISCIPLINE COST ANALYSIS FOR FISCAL YEAR 1987
Report to the Board of Trustees BT88-3
December 1987

Overview: Discipline cost data as submitted to the State Board for Community Colleges are reported for fiscal year 1987, along with aggregate figures since 1980 for comparative purposes. The overall cost per full-time-equivalent student in FY87 was $3,118, up 7.5 percent from the year before.

Introduction and Methodology

Community colleges in Maryland have been reporting discipline cost information to the State Board for Community Colleges for over a decade. The discipline cost analysis system as developed by SBCC yields cost per course, cost per student credit hour, and cost per full-time-equivalent student for each instructional discipline. The analysis uses actual expenditure data and is run at the end of each fiscal year. Costs are assigned to individual course sections and then amalgamated at the discipline level. The resulting unit cost figures are for disciplines or subject areas rather than curricula or programs.

Total cost figures are the sum of faculty compensation, additional direct instructional costs (including classroom or laboratory supplies and equipment) and indirect or overhead costs (allocated to each section based on credit hours generated). In fiscal year 1987, total costs were constituted as follows for credit (both general and occupational education) courses:

Components of Total Cost, Credit Courses, FY87

	Cost per Credit Hour	Cost per FTE	Percent of Total
Faculty compensation	$48.97	$1,469	44%
Additional direct cost	3.64	109	3
Overhead	59.38	1,782	53
Total cost	$111.99	$3,360	100%

Limitations

This report is limited to an analysis of unit cost data produced by the State Board for Community Colleges discipline cost analysis system. The state tends to focus on total cost per credit hour or FTE in its use of these data. It can be argued that analysis of the direct (faculty compensation and additional direct) costs exclusive of overhead would be more fruitful for discipline-level analysis. Instructional cost center managers cannot be held responsible for controlling indirect costs. Indirect costs should be analyzed separately, utilizing comparative staffing, physical plant, and other statistics for similar institutions for reference. Inclusion of overhead in discipline comparisons can dilute the differences in direct costs. For example:

(1) Using total cost per FTE:

Nursing total cost/FTE	$5,110
Collegewide total cost/FTE for credit coursework	3,360

Nursing is 52 percent above average college cost

(2) Using direct cost per FTE:

Nursing direct cost/FTE	$3,328
Collegewide direct cost/FTE	1,578

Nursing is 110 percent above average college cost

Because of the large impact of indirect costs, statewide and inter-institutional comparisons of total cost unit figures can be problematic. Apparent differences in discipline costs may reflect variations in overhead. For internal management purposes, an alternative analytical approach would be to calculate the "contribution to overhead" generated by course offerings in each discipline. Overhead contribution would consist of the direct, variable, or incremental revenue (tuition, fees, state aid) generated by course offerings, less the direct costs associated with delivering these courses. Courses with a net positive contribution to overhead would be contributing toward the fixed, non revenue producing overhead costs of the college. Disciplines with a negative overhead contribution would warrant further analysis, to ensure that their benefits in meeting student and county needs justified their claims on institutional resources. Sound evaluation would include many factors other than fiscal.

Users of the state's discipline cost data should also be aware of the determinants of direct costs. Factors other than inflation that influence discipline costs include average class

size, full- and part-time faculty utilization, faculty rank, equipment and support costs, and instructional methodology. High contact/credit hour ratios, limited class capacities, and expensive equipment requirements often yield high costs for disciplines with extensive clinical or laboratory courses. Three factors accounting for much of the variation across disciplines are:

(1) **Average class size.** Large classes bring average costs down. Courses attracting fewer students or with enrollment capacity limitations due to equipment or clinical supervision constraints necessarily have higher average costs. With a direct impact on the denominator of the ratio calculations, class size explains a large part of the variation in discipline unit costs. Large class sizes can mitigate the influence of disparate faculty compensation rates.

(2) **Full-time/part-time faculty ratio.** Departments with a high proportion of part-time faculty will have lower average costs than those where a higher percentage of courses are taught by full-time instructors. On average, full-time instructors receive compensation more than three times that of part-time faculty for a given teaching load. Younger disciplines, whose growth was made possible by employment of part-time instructors, usually have lower average costs than older, established disciplines with relatively stable enrollments and staffed primarily by full-time faculty.

(3) **Faculty rank.** Full professors at the top of the scale receive compensation two and a half times that of beginning assistant instructors. Disciplines taught primarily by full professors with many years of service to PGCC will, other things being equal, have higher unit costs than those staffed with more recent hires of lower rank.

Because of the major influence of faculty compensation on direct costs, apparent differences in per-student costs between disciplines may reflect institutional history more than any inherent productivity differences between disciplines. A discipline may be less expensive because it is relatively new, or because it grew during a period when the college was not adding full-time faculty, rather than due to the nature of its subject matter or instructional methodology. A different research design, using FTE faculty or similar measures rather than salaries, might be more appropriate if productivity comparisons untainted by length of service or other historical factors was the goal.

This discussion of the limitations of the SBCC discipline cost analysis should not imply that it is not of value. The unit cost figures generated by the existing state system are a fair representation of actual expenditures for delivering courses in different disciplines. Physical education, at $5,894 per FTE in

FY87, was twice as expensive (including overhead charges) to deliver as mathematics, at $2,947, given current staffing and enrollment patterns. (In terms of direct costs alone, physical education was 3.5 times as expensive as mathematics.) The balance of this report analyzes the total costs per FTE as generated by the state software. These are the figures used by the State Board for Community Colleges in its program data monitoring system and other reports.

Trends in Overall Cost per Student, FY80-87

In fiscal year 1987, the college expended $28.6 million to deliver courses to the equivalent of 9,172 full-time students, in both credit and noncredit programs. The resulting cost per student was $3,118, up 7.5 percent from fiscal year 1986. Total costs, FTE students, and costs per student for the past eight fiscal years are presented in the following table:

Total Cost per FTE Student, FY80-87

Fiscal Year	Total Expenditures	Total FTEs	Cost per FTE
1987	$28,598,742	9,172	$3,118
1986	25,975,507	8,960	2,899
1985	25,143,727	9,252	2,718
1984	24,447,040	9,423	2,594
1983	23,276,218	9,630	2,417
1982	19,926,005	9,273	2,149
1981	18,348,552	8,792	2,087
1980	17,047,392	8,638	1,974

Per Student Cost Trends, by Discipline Type, FY80-87

General education courses in the arts and sciences continued to be more expensive than occupational or continuing education instruction. The average cost per student in general education courses in fiscal year 1987 was $3,416, an eight percent increase from 1986. Occupational credit courses cost an average of $3,243 per FTE, up nine percent. Community Services noncredit courses cost $2,520 per FTE in FY87, also up nine percent from the prior year. Costs per FTE student in each discipline type for the past eight fiscal years were as follows:

Total Cost per FTE Student, by Discipline Type, FY80-87

Fiscal Year	General Education	Occupational Education	Community Services
1987	$3,416	$3,243	$2,520
1986	3,159	2,976	2,307
1985	3,011	2,843	1,842
1984	2,708	2,553	2,267
1983	2,475	2,366	2,253
1982	2,190	2,189	2,008
1981	2,105	2,059	2,055
1980	2,193	1,965	1,870

Per-student Costs in Individual Disciplines in FY87

Per-student costs were identified for 52 disciplines in fiscal year 1987. Total cost (including overhead allocations),total FTEs, and cost per FTE for each general education and occupational discipline are presented in appended tables. Average per-student costs for each major discipline cluster were as follows:

Total Cost per FTE Student, by Discipline Cluster, FY87

Physical and Health Education	$5,520
Health Technology	5,399
Engineering Technology	4,379
Natural Sciences	3,816
English Studies	3,657
Humanities	3,493
Social Sciences	3,082
Computer Technology	3,080
Mathematics/Engineering	2,962
Business and Management	2,924
Social Services	2,785
Developmental Studies	2,746

Cost per FTE in individual degree-credit disciplines ranged from a high of $12,595 in Medical Laboratory Technician (extraordinarily high due to declining enrollment as the associated program is being phased out) to a low of $2,423 in Early Childhood Management courses. Disciplines with at least 5 FTEs in FY87 and per-student costs at the extremes were as follows:

High and Low Cost Disciplines in Fiscal Year 1987

Highest Cost per FTE		Lowest Cost per FTE	
1. Medical Isotope	$8,291	1. Early Child. Mgt.	$2,423
2. Radiography	6,266	2. Marketing	2,467
3. Mech. Eng. Tech.	6,090	3. Paralegal	2,625
4. Physical Education	5,894	4. Developmental Math	2,635
5. Respiratory Therapy	5,500	5. Economics	2,669

Statewide Comparisons, FY82-84-86

To place PGCC's cost data in perspective, statewide information was obtained from the State Board for Community Colleges for fiscal years 1982, 1984, and 1986. (Fiscal year 1987 data for the state were not yet available.) These figures document PGCC's relative cost efficiency. During this period, Prince George's spent substantially less per student to deliver credit courses than both the average for the six largest community colleges in the state and the overall statewide community college average:

Total Cost per Student, by Discipline Type, FY82-86

	FY82	FY84	FY86	Percent Change 82-86
General Education				
Prince George's Comm. Coll.	$2,190	$2,708	$3,159	+44
Average 6 largest MD CC's	2,724	3,027	3,462	+27
Statewide average	2,694	3,039	3,498	+30
Occupational Education				
Prince George's Comm. Coll.	$2,189	$2,553	$2,976	+36
Average 6 largest MD CC's	2,654	2,976	3,430	+29
Statewide average	2,643	3,031	3,532	+34
Continuing Education				
Prince George's Comm. Coll.	$2,008	$2,267	$2,307	+15
Average 6 largest MD CC's	1,958	2,213	2,368	+21
Statewide average	2,073	2,191	2,438	+18

PGCC's per-student costs for credit classes in general and occupational education, though they increased at a greater rate

than state averages over the FY82-86 period, remained notably lower than state averages. Community Services unit costs fell below statewide averages as a result of a lower rate of increase over the period.

These figures may be interpreted two ways. Prince George's can be proud that it delivers quality education relatively inexpensively, evidence of cost-effective management. But the comparatively low per-student expenditures also mean that the college has had relatively fewer resources to expend. The colleges that have more to spend per student are probably not unhappy with their situation.

Constant Dollar Cost per FTE Trends

While PGCC's unit costs have been comparatively low, they increased steadily in recent years. How much of the increasing per-student cost can be explained by inflation? One way to assess this is to convert expenditures to constant (uninflated) dollars by use of a price index. Changes in the price index reflect changes in the dollars required to purchase the same kinds and amounts of goods and services previously purchased. (The price index measures price changes from a designated reference date, for example 1971, which is given the value 100.0. An index of 115 would represent a 15 percent increase over 1971 values; goods and services purchased for $100 in 1971 would cost $115.) A special index has been developed to measure price changes in the goods and services typically purchased by colleges through current fund educational and general expenditures. This Higher Education Price Index or HEPI is preferable to general consumer price indices for analyzing college costs, since it reflects price changes most pertinent to higher education. Total costs per FTE student, expressed in 1971 dollars, for fiscal years 1980 through 1986 are displayed in the following table:

Constant Dollar Cost per FTE, Fiscal Years 1980-86

Fiscal Year	Total Expenditures	HEPI (1971=100)	Constant Dollars	FTEs	Constant $ per FTE
1986	$25,975,507	282	$9,211,173	8,960	$1,028
1985	25,143,727	270	9,312,491	9,252	1,007
1984	24,447,040	253	9,662,862	9,423	1,025
1983	23,276,218	240	9,698,424	9,630	1,007
1982	19,926,005	226	8,816,816	9,273	951
1981	18,348,552	205	8,950,513	8,792	1,018
1980	17,047,392	185	9,214,806	8,638	1,067

Deflating expenditures to constant 1971 dollars has reinforced the earlier finding of PGCC's cost efficiency. The real or

inflation-adjusted cost per student in FY86 was less than that of FY80. The college spent less (in constant dollars) educating more students in FY86 than in FY80. Components of the HEPI that had relatively large price increases over this period included utilities, books and periodicals, and employee fringe benefits.

Summary

The overall cost per full-time equivalent student in fiscal year 1987 was $3,118, up 7.5 percent from FY86. For credit courses, the average cost was $3,360; for noncredit, $2,520. PGCC's costs per student continued to be less than both statewide averages and averages for the six largest Maryland community colleges. Adjusting for inflation revealed that PGCC's cost per student in 1986 was less than that of 1980. Thus, comparisons with other institutions and over time reinforced the conclusion that Prince George's continues to be relatively cost efficient.

Craig A. Clagett
Director of Institutional
Research and Analysis

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PRINCE GEORGE'S COMMUNITY COLLEGE

Total Cost per FTE, Occupational Disciplines, Fiscal Year 1987

	Total Discipline Cost	Total FTEs	Total Cost per FTE
Medical Laboratory Technician	41,564	3.3	$12,595
Medical Isotope Technology	79,591	9.6	8,291
Radiologic Technology	108,405	17.3	6,266
Respiratory Therapist	95,311	17.3	5,500
Nursing	646,431	126.5	5,110
Medical Records Technician	77,370	15.9	4,866
Health Services	38,751	11.5	3,370
Total Health Technology	1,087,423	201.4	5,399
Mechanical Eng. Technology	54,990	9.0	6,090
Electronics Eng. Technology	248,416	55.6	4,470
Drafting Technology	120,891	32.3	3,743
Total Engineering Technology	424,297	96.9	4,379
Computer Service Technology	87,769	22.6	3,889
Computer Programming/Analysis	1,244,703	410.1	3,035
Total Computer Technology	1,332,472	432.7	3,080
Office Administration	505,241	104.2	4,850
Hospitality Services	140,222	38.3	3,661
Accounting	1,111,713	403.9	2,753
Management	1,306,269	480.8	2,717
Real Estate	196,220	72.4	2,710
Marketing	240,575	97.5	2,467
Total Business/Management	3,500,240	1,197.0	2,924
Early Childhood Education	81,873	21.8	3,761
Criminal Justice	268,535	99.1	2,711
Para-Legal/Legal Assistant	194,871	74.2	2,625
Early Childhood Management	13,084	5.4	2,423
Total Social Services	558,363	200.5	2,785
TOTAL OCCUPATIONAL DISCIPLINES	$6,902,795	2,128.5	$3,243

PRINCE GEORGE'S COMMUNITY COLLEGE

Total Cost per FTE, General Education Disciplines, Fiscal Year 1987

	Total Discipline Cost	Total FTEs	Total Cost per FTE
Physical Education	902,127	153.1	$5,894
Health Education	208,910	48.2	4,334
Total Physical/Health Educ.	1,111,037	201.3	5,520
Career Planning*	318,414	52.5	6,062
Honors	24,986	3.9	6,407
Literature	344,673	86.2	3,999
Composition/Career English	2,214,661	613.7	3,609
Total English Studies	2,559,334	699.9	3,657
Education	76,866	23.7	3,243
Physics	182,760	40.8	4,479
Chemistry	465,848	112.7	4,132
Biology	933,216	250.4	3,727
Physical Science	319,159	94.3	3,385
Total Natural Sciences	1,900,983	498.2	3,816
Foreign Languages	273,717	65.0	4,211
Art	508,592	132.5	3,839
Theatre	91,280	26.2	3,484
Music	257,907	75.1	3,434
Philosophy	271,261	79.3	3,421
English as a Foreign Language	219,328	64.6	3,395
Speech Communication	886,875	275.6	3,218
Total Humanities	2,508,960	718.2	3,493
Anthropology	34,580	7.4	4,673
Geography	81,259	23.1	3,518
Political Science	278,556	80.5	3,460
Sociology	469,212	140.2	3,347
History	830,490	266.1	3,121
Psychology	903,539	300.1	3,010
Economics	503,286	188.6	2,669
Total Social Sciences	3,100,922	1,006	3,082

PRINCE GEORGE'S COMMUNITY COLLEGE

Total Cost per FTE, General Education Disciplines, Fiscal Year 1987

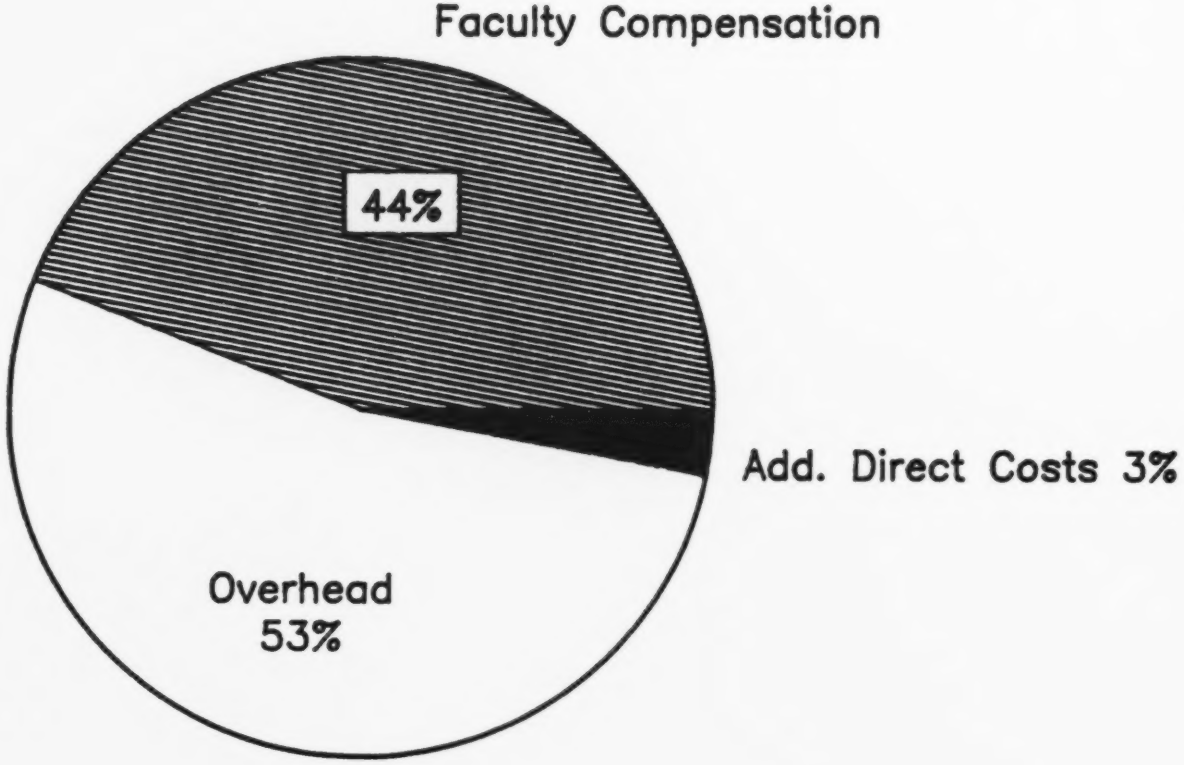
	Total Discipline Cost	Total FTEs	Total Cost per FTE
Engineering	109,404	33.6	3,256
Mathematics	1,890,172	641.4	2,947
Total Math/Engineering	1,999,576	675.0	2,962
College Learning Skills	13,845	4.7	2,965
Developmental English/Reading	683,611	237.5	2,879
Developmental Mathematics	744,091	282.4	2,635
Total Developmental Studies	1,427,702	519.9	2,746
TOTAL GENERAL EDUCATION	$15,042,625	4,403.3	$3,416

* State programs allocate additional direct costs by subtracting faculty compensation from total cost center expenditures, dividing this by the number of credit hours taught by the department, and multiplying the resulting rate by the number of student credit hours generated by each course. Individual course costs are summed to yield discipline costs. The method assumes that all cost center expenditures support instruction. This is a reasonable assumption in most cases. However, the expenditures of cost center 093 support operation of the career center library and counseling services as well as credit career planning courses. Thus the state method overstates the additional direct cost component, and thus total costs and cost/FTE, of the career planning (CAP) courses. Based on the college-wide additional direct cost average, per-student costs in CAP courses would have been an estimated $4,566/FTE.

SOURCE: SBCC Discipline Cost Analysis.

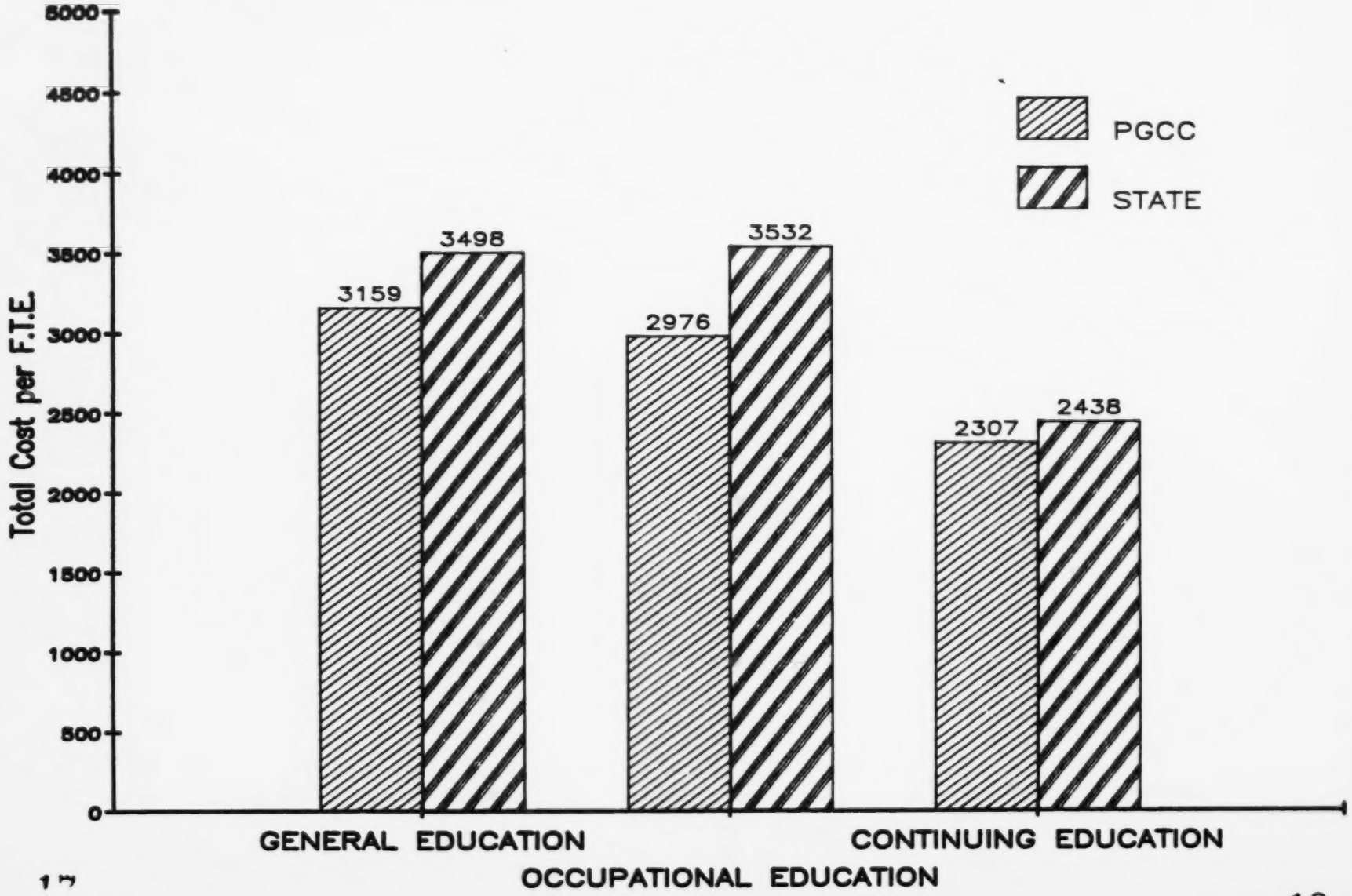
COMPONENTS OF TOTAL COST

Credit Courses, FY87



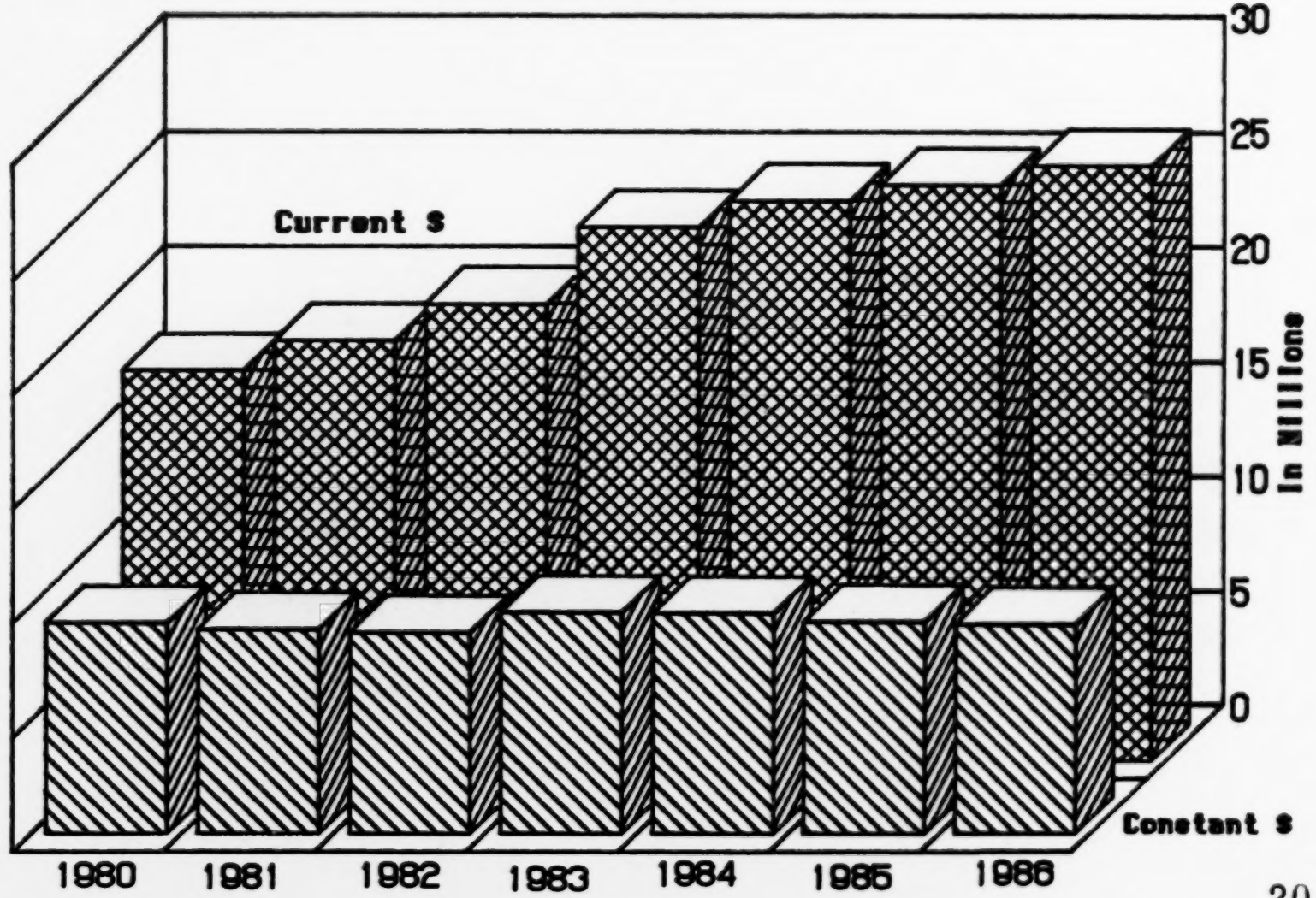
Total Per–Student Cost = $3,360

TOTAL COST PER F.T.E. IN FY86



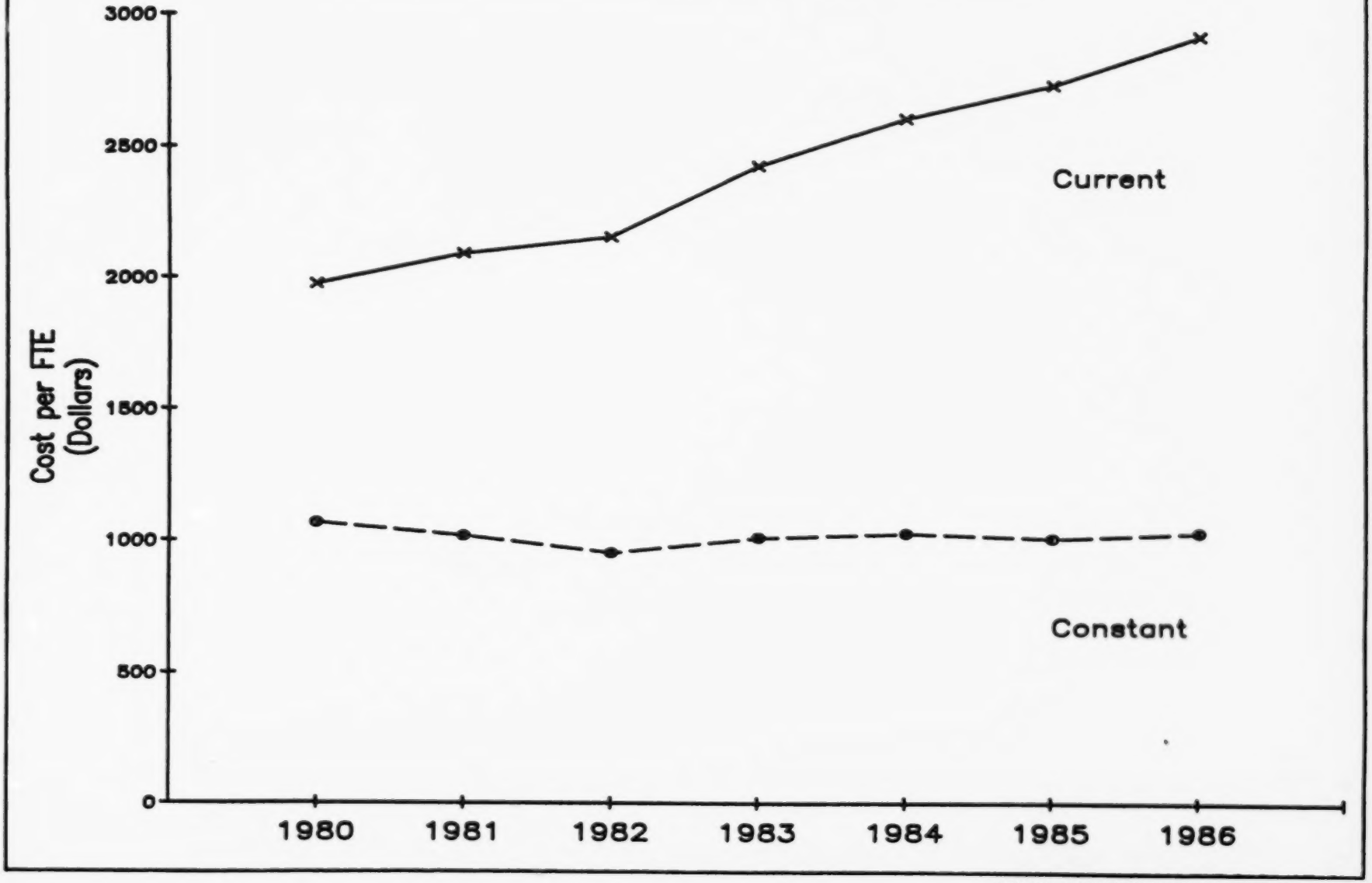
Current and Constant Dollar Expenditures

Fiscal Years 1980 - 1986



COST PER FTE STUDENT, FY80–86

Current and Constant (1971) Dollars



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